zu PC 11209 EP

(12) UK Patent Application (19) GB (11) 2 234 569 (13) A

(43) Date of A publication 06.02.1991

(21) Application No 8916884.3

(22) Date of filing 24.07.1989

(51) INT CL[5]
F16H 21/18

(52) UK CL (Edition K)
F2K K4B1B
F2Q Q3A2
U1S S1659

(55) Documents cited
None

(58) Field of search
UK CL (Edition J) F2K, F2Q
INT CL[4] F16H

(71) Applicant
Bielomatik London Limited

(Incorporated in the United Kingdom)

Cotswold Street, London, SE27 0DP, United Kingdom

(72) Inventor
Leslie Robert Hooper

(74) Agent and/or Address for Service
A A Thornton & Co
Northumberland House, 303-306 High Holborn,
London, WC1V 7LE, United Kingdom

(54) **Reciprocating drive mechanism**

(57) A reciprocating shower in a paper mill is driven from a rotary drive 12 through a variable velocity ratio universal coupling (Hooke's joint) so as to convert a constant velocity drive into a variable velocity ratio drive of the crank 7.

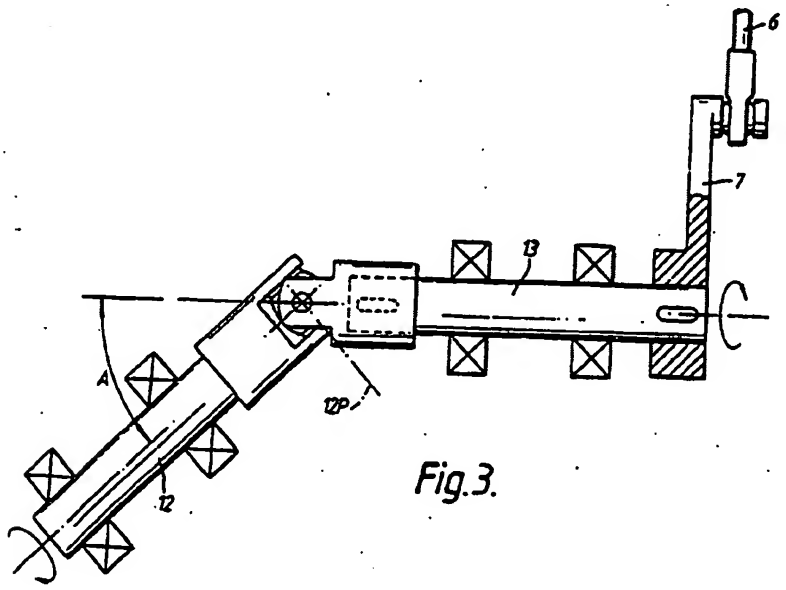

Fig.3.

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

GB 2 234 569 A

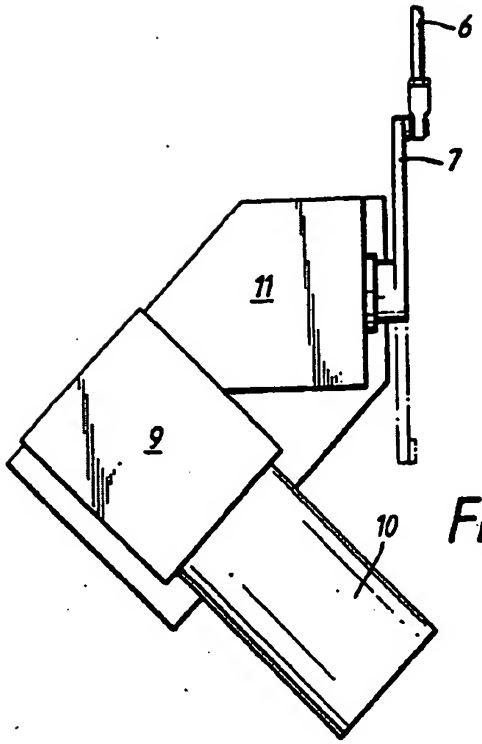

Fig.2.

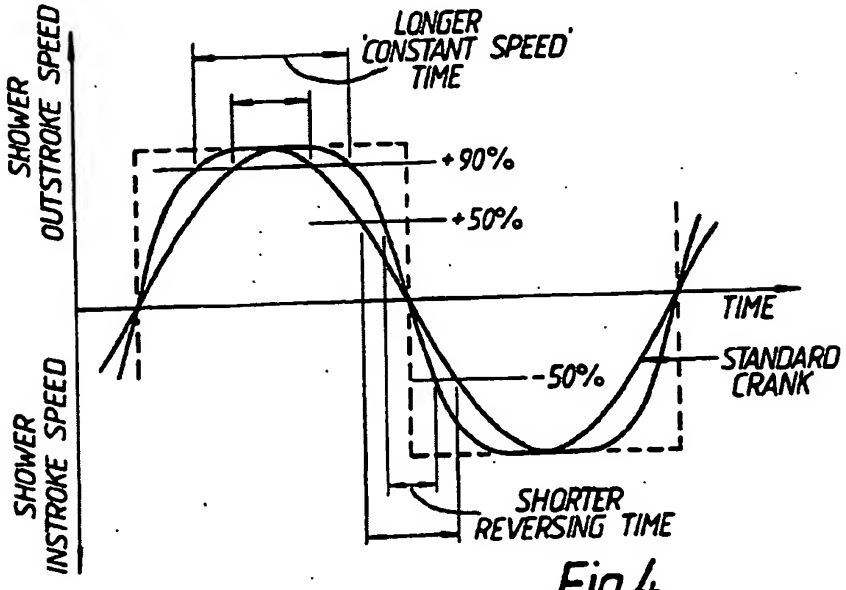

Fig.4.

Reciprocating shower drive mechanisms

This invention relates to drive mechanisms for reciprocating showers in paper mills.

Reciprocating showers are employed in various sections of paper mills, for example in the Fourdrinier section where their function is to cleanse the return section of the so-called "wire", or conveyor belt for pulp and fibres. Such a shower comprises an elongate pipe extending transversely of the conveyor belt and having outlet holes at intervals along its length through which water or an aqueous solution is directed onto the conveyor belt as high pressure jets. The pipe is slowly reciprocated to ensure that the belt is washed across its full width by the jets.

Conventional drive mechanisms comprise simple crank drives, which are very reliable in operation, in spite of the very difficult environmental conditions, but they have the well-known disadvantage that the linear motion of the shower is subject to cyclic acceleration and deceleration, the shower having its maximum velocity across the central region of the belt and minimum decelaration and acceleration at the edges of the belt, so that the lateral margins are wetted more than the central region.

Ideally, of course, the speed of traversing of the shower would be constant across the width of the belt

The pipe is driven through a con-rod 6 from a simple rotary crank 7 which is continuously driven, typically at a speed of about 1 revolution per minute.

The drive mechanism is illustrated in more detail in Figures 2 and 3. The mechanism comprises a rotary motor 8, a gearbox 9 and an intermediate transmission section 11. The motor and gearbox are conventional in themselves and do not require detailed description, save to say they transmit a constant velocity drive, typically of about 1 r.p.m. to the transmission section 11.

As shown in Figure 3, the section 11 consists essentially of a Hooke's joint universal coupling having an input shaft 12 and an output shaft 13 set at an angle A of about 40° to 45° to each other, both being supported by rotary bearings. The output shaft 13 is keyed to the crank 7. In the position shown in Figure 3, the crank is at one extreme of its throw and the pivot axis 12P of the input shaft of the coupling is in a plane which also contains the axes of the input and output shafts. When the input shaft is rotated from this position at constant speed, the output shaft is given its maximum velocity, decelerating through the first 90° of rotation, then accelerating again through the next 90°.

Thus the cyclic variations of angular velocity of the output shaft and the crank are 180° out of phase with those of the shower pipe, which has the effect of reducing the period of reversal of the shower at each end of its stroke, and increasing the period for traversing the central region of its stroke.

Figure 4 illustrates this effect in graph form. The square wave-form in dotted lines shows the ideal situation, with instantaneous reversal at the ends of the stroke and constant velocity in between. The pure sine wave-form illustrates motion of the shower drive by a

CLAIMS

1. A drive mechanism for a reciprocating shower, comprising a crank mechanism coupled to a rotary drive through the intermediary of at least one Hooke's joint universal coupling whose input and output shafts are set at an angle to each other and whose angular relationship to the crank mechanism is such that the crank is accelerated at the ends of its stroke and decelerated in the intermediate portion of its stroke during constant velocity rotation of the input shaft of the universal coupling.

2. A drive mechanism according to claim 1, comprising a single universal coupling.

3. A drive mechanism according to claim 2, wherein the input and output shafts of the universal coupling are set out at an angle of 40° to 45° to each other.

4. A drive mechanism according to claim 1 comprising a plurality of said universal couplings connected together in series between the rotary drive and the crank.

5. A drive mechanism for a reciprocating shower, substantially as herein described with reference to the accompanying drawings.